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10/506,668	09/07/2004	Hiroyuki Hasegawa	042664	4964

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EXAMINER
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SEMENENKO, YURIY

ART UNIT	PAPER NUMBER
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2841

MAIL DATE	DELIVERY MODE
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08/24/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/506,668

Applicant(s)

HASEGAWA ET AL.

Examiner

Yuriy Semenenko

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 20-41 is/are pending in the application.
- 4a) Of the above claim(s) 25-41 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24 is/are allowed.
- 6) ☒ Claim(s) 20-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Amendment filed on 06/20/2007 has been entered.

In response to the Office Action dated 12/20/2006, Applicants have amended claims 20 and 22. Claims 25-41 had been withdrawn from consideration. Claims 1-19 had been cancelled.

Claims 20-41 are now pending in the application.

### ***Specification***

2. The Specification amendments, filed on 06/20/2007 are considered and acknowledged. The Specification amendments are approved.

### ***Response to Arguments***

3. Applicant's arguments filed on 06/20/2007 are considered and acknowledged, but they are not persuasive.

3.1. First of all the Examiner points out that general discussion limitation "an electrically conductive nano-wire" is not proper here because the Applicants before non-elected Group IV, claims 30-32 drawn an electrical conductive nano-wire, in the Response to the Restriction/Election requirement filed on 09/06/2007. This limitation may be considered here only as intended use but not as structural limitation. If in preamble "an electrolytic apparatus for producing an electrically conductive wire" limitation "an electrically conductive wire" consider as structural limitations then such the amendment can not be treated as fully responsive, (see MPEP 714.02).

3.2. In response to applicant's arguments against the references individually, Applicants cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413,

208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. In this case the Applicants argue that " Nakayama does not disclose an "electrically conductive nano-wire" and further in the same par. "the Nakayama reference does not disclose an "electrolytic apparatus for producing an electrically conductive nano-wire," However, Admitted by Applicant Prior Art, hereinafter "APA" discloses an apparatus producing an electrically conductive wire, which inherently comprises two electrodes with a gap in between them, and an electrolytic cell for holding an electrolyte and the two electrodes. APA , references *Moriyama et al.* (Japanese Patent JP-06-321686) and *Muller* (US Patent 5,501,778) disclose the electrically conductive wire and prove inherency of mention above limitations for such electrolytic apparatus. So, as follows from discussion above it is not necessary to prove electroconductivity of the nuno-tube because this property including in the these references. Nakayama's reference apply only to show that at the time the invention was made, it was well known to use two electrodes 22, 23 and a voltage control device 19, 26, Fig. 12 for controlling the voltage applied across the two electrodes; and cell holds an electrophoretic solution 20 containing molecules that is to constitute an arrangement of the nano-tube (column 2, lines 35-48), and generate a gradient of voltage between the two electrode by applying a voltage across the two electrodes in the state wherein the solution and the two electrodes are in contact (column 2, lines 40-67). The Applicants teach "The term nano-wire used herein means a linear substance of a width of the width of a molecule to 1  $\mu$ m and a length of the length of two molecules or longer, wherein molecules are regularly arrayed. " (specification ,page 22) The Examiner now corrects a grammatical error to eliminate above misunderstanding.

3.3. In response to Applicant's argument that there is no suggestion to combine the Boggild references, the Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. In *re Nomiya*, 184 USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole would suggest to

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one of ordinary skill on the art. In re McLaughlin, 170 USPQ 209 (CCPA 1971). References are evaluated by what specific disclosures. In re Bozek, 163 USPQ 545 (CCPA) 1969. In this case, Boggild discloses in Fig. 1 the gap between the two electrodes 5 is from 1 nm to 100  $\mu$ m ( page 4, [0059]). It has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. Boggild's reference satisfied this requirements its belongs to nanotechnology same as the field of applicant's endeavor.

3.4. In respect to claim 22 the Examiner pointed out that substrate plug is inherent part of the electrolytic cell (see for example Nakayama, 12, Fig. 3). At time the invention was made, it was well know that design of the substrate plug permits variations. It is why the changes in design are the matter of the engineering choice. Further, it has been held to be within the general skill of a worker in the art to make reversal of parts as matter of obvious engineering choice, In re Gazda, 219 F.2d 449, 104 USPQ 400 (CCPA 1955)

3.5. In respect to claim 23 the Examiner state that without the insulators on substrate and on electrodes electrolytic apparatus can not generate a gradient of voltage between the two electrode by applying a voltage across the two electrodes in the state wherein the electrolyte and the two electrodes are in contact (see rejection below). It is means that the insulator electrically isolate mentioned above parts, but the Examiner never stated that "[t]he insulating portion affect the voltage gradient between the two respective electrodes." as asserted by the Applicants.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented

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and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted by Applicant Prior Art, hereinafter "APA" in view of Nakayama et al. (Patent # 6892432 hereinafter Nakayama ) and in view of Boggild (PGPub. #2002/0061662).

As to claim 20: APA discloses an electrolytic apparatus for producing an electrically conductive wire (specification, page 2) inherently comprising: two electrodes, an electrolytic cell for holding an electrolyte and the two electrodes, the gap between the two electrodes, and the electrically conductive wire is produced between the two electrodes or above the two electrodes (specification, page 1, 2, and for example Moriyama et al. (Patent JP-06-321686) hereinafter Moriyama, [0003], [0006]), by allowing the electrolytic cell to hold an electrolyte co two electrodes 22, 23 and a voltage control device 19, 26, Fig. 12 for controlling the voltage applied across the two electrodes; and cell holds an electrophoretic solution 20 containing molecules that is to constitute an arrangement of the nano-tube (column 2, lines 35-48), and generate a gradient of voltage between the two electrode by applying a voltage across the two electrodes in the state wherein the solution and the two electrodes are in contact (column 2, lines 40-67).

containing molecules that is to constitute an electrically conductive wire (for example Moriyama, Fig. 2 and Muller et al. (Patent #5501778) hereinafter Muller), wherein the electrolyte and the two electrodes are in contact (Moriyama and Muller).

However, APA does not teach the electrically conductive wire is the nano-wire; and a voltage control device for controlling the voltage applied across the two electrodes; and electrolytic cell holds an electrolyte containing molecules that is to constitute a nano-wire, and generate a gradient of voltage between the two electrode by applying a voltage across the two electrodes in the state wherein the electrolyte and the two electrodes are in contact.

Nakayama discloses in "Background of the invention" section, Fig. 11, at the time the invention was made, it was well known to use two electrodes 22, 23 and a voltage control device 19, 26, Fig. 12 for controlling the voltage applied across the two electrodes; and cell holds an electrophoretic solution 20 containing molecules that is to constitute an arrangement of the nano-tube (column 2, lines 35-48), and generate a gradient of voltage between the two electrode by applying a voltage across the two electrodes in the state wherein the solution and the two electrodes are in contact (column 2, lines 40-67).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for APA to include in his invention that the electrically conductive wire is the nano-wire; and a voltage control device for controlling the voltage applied across the two electrodes; and electrolytic cell holds an electrolyte containing molecules that is to constitute a nano-wire, and generate a gradient of voltage between the two electrode by applying a voltage across the two electrodes in the state wherein the electrolyte and the two electrodes are in contact as taught by Nakayama because Nakayama teaches that such a configuration would made a probe needle that detects information by directly contacting the sample surface in required (column 1, lines 16-20).

APA fail also to discloses the gap between the two electrodes is from 1 nm to 100  $\mu\text{m}$ .

Boggild discloses in Fig. 1 the gap between the two electrodes 5 is from 1 nm to 100  $\mu\text{m}$  ( page 4, [0059]).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for APA to include in his invention that the gap between the

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two electrodes is from 1 nm to 100  $\mu$ m, in order to manipulate with nanoscale structures, as taught by Boggild (page 1, [0013]).

As to claim 21: APA discloses an electrolytic apparatus for producing an electrically conductive nano-wire having all of the claimed features as discussed above with respect claim 20,

However, APA does not teach that the two electrodes are formed on a substrate.

Nakayama discloses in "Background of the invention" section, Fig. 11 and 12 at the time the invention was made, it was well known to use the two electrodes 22, 23 are formed on a substrate 21, (column 2, lines 35-40).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for APA to include in his invention that the two electrodes are formed on a substrate to make holder for nano-tube cartridge, as taught by Nakayama (column 3, lines).

As to claim 22: APA discloses an electrolytic apparatus for producing an electrically conductive wire (specification, page 2) inherently comprising: two electrodes facing each other, the electrolytic cell comprises: an electrolyte holder section for holding the electrolyte (intended use), and the two electrodes, the gap between the two electrodes, and the electrically conductive wire is produced between the two electrodes or above the two electrodes (specification, page 1,2, and for example Moriyama et al. (Patent JP-06-321686) hereinafter Moriyama, [0003], [0006]), by allowing the electrolytic cell to hold an electrolyte containing molecules that is to constitute an electrically conductive wire (for example Moriyama, Fig. 2 and Muller et al. (Patent #5501778) hereinafter Muller), wherein the electrolyte and the two electrodes are in contact (Moriyama and Muller).

Although APA does not explicitly teach the electrolytic cell comprises a substrate plug section for plugging the substrate (intended use), it has been held to be within the general skill of a worker in the art to make reversal of parts as matter of obvious engineering choice, In re Gazda, 219 F.2d 449, 104 USPQ 400 (CCPA 1955)



Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for APA to include in his invention that the electrolytic cell comprises a substrate plug section for plugging the substrate in order to easy assemble electrolytic cell.

However, APA does not teach the electrically conductive wire is the nano-wire; and the electrolytic cell comprises: an electrolyte holder section for holding the electrolyte, and the electrodes are formed on substrate and a voltage control device for controlling the voltage applied across the two electrodes; and electrolytic cell holds an electrolyte containing molecules that is to constitute a nano-wire, and generate a gradient of voltage between the two electrode by applying a voltage across the two electrodes in the state wherein the electrolyte and the two electrodes are in contact.

Nakayama discloses in "Background of the invention" section, Fig. 11, at the time the invention was made, it was well known to use the cell comprises: an electrophoretic solution holder section for holding the solution (intended use), and two electrodes 22, 23 are formed on a substrate 21, (column 2, lines 35-40), a voltage control device 19, 26, Fig. 12 for controlling the voltage applied across the two electrodes; and cell holds an solution containing molecules that is to constitute an arrangement of the nano-tube (column 2, lines 35-49), and generate a gradient of voltage between the two electrode by applying a voltage across the two electrodes in the state wherein the solution and the two electrodes are in contact (column 2, lines 40-67).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for APA to include in his invention that the electrolytic cell comprises: an electrolyte holder section for holding the electrolyte, and the electrodes are formed on substrate and the electrically conductive wire is the nano-wire; and a voltage control device for controlling the voltage applied across the two electrodes; and electrolytic cell holds an electrolyte containing molecules that is to constitute a nano-wire, and generate a gradient of voltage between the two electrode by applying a voltage across the two electrodes in the state wherein the electrolyte and the two electrodes are in contact as taught by Nakayama because Nakayama teaches that

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such a configuration would made a probe needle that detects information by directly contacting the sample surface in required (column 1, lines 16-20).

APA fail also to discloses the gap between the two electrodes is from 1 nm to 100  $\mu\text{m}$  and the two electrodes have respective protrusions located either between both ends of each electrode and extending toward the other electrode, or on one end of each electrode and extending toward the other electrode by bending the each electrode at the one end;

Boggild discloses in Fig.1 the gap between the two electrodes 5 is from 1nm to 100  $\mu\text{m}$  (page 4, [0059]), the two electrodes have respective protrusions located between both ends of each electrode and extending toward the other electrode 15, Fig. 3B.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for APA to include in his invention that the gap between the two electrodes is from 1 nm to 100  $\mu\text{m}$  and the two electrodes have respective protrusions located either between both ends of each electrode and extending toward the other electrode, or on one end of each electrode and extending toward the other electrode by bending the each electrode at the one end in order to manipulate with nanoscale structures, as taught by Boggild (page 1, [0013]).

As to claim 23: APA discloses an electrolytic apparatus for producing an electrically conductive nano-wire having all of the claimed features as discussed above with respect claim 22, and inherently the two electrodes have an insulated portion covered with an insulator; and the site of the substrate plug section exposing the substrate when the substrate is plugged in the substrate plug section is covered with an insulator. Without such insulators on substrate and on electrodes electrolytic apparatus can not generate a gradient of voltage between the two electrode by applying a voltage across the two electrodes in the state wherein the electrolyte and the two electrodes are in contact.

However, APA does not teach each end of the protrusions of the two facing electrodes faces each other in parallel.

Boggild discloses in Fig.1 the gap between the two electrodes 5 is from 1nm to 100  $\mu\text{m}$  (page 4, [0059]), the two electrodes have respective protrusions located between both ends of each electrode and extending toward the other electrode 15, Fig. 3B and each end of the protrusions of the two facing electrodes faces each other in parallel.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for APA to include in his invention that each end of the protrusions of the two facing electrodes faces each other in parallel in order to manipulate with nanoscale structures, as taught by Boggild (page 1, [0013]).

#### ***Allowable Subject Matter***

5. The Examiner confirms allowance of the claim 24.

#### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yuriy Semenenko whose telephone number is (571) 272-6106. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean A. Reichard can be reached on (571)-272-2800 ext. 31. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TUAN T. DINH  
PRIMARY EXAMINER

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